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ITR/P1-05: Development of ITER Equatorial EC Launcher

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The present day EC launcher typically injects a few MW power and the pulse length is 10~20s. On the other hand, the ITER equatorial EC launcher is making an advanced technology to injecting ≥ 20 M and CW operation. The ITER equatorial EC launcher consists of a unique blanket shield structure and a port plug installing millimeter (mm) wave components, neutron shields, cooling water lines and so on. The design of the blanket shield structure that tolerates thermal and electromagnetic load is attained. The mm-wave design that enables to guide the wave power of 20MW into plasma with toroidal steering capability of 20°~40° and efficiency of 98.4~99% assuming HE11 fundamental wave mode + TEM000 gaussian mode are described. Reduction of the heat load to 2.1MW/m² on the steering mirror and the optimization of beam radius at plasma, 16~22cm that satisfies the requirement, are attained. The mock-up of the mm-wave launching system and the subcomponents are fabricated to investigate the design availability. High power (0.5MW) experiment of the mock-up confirmed the expected wave beam propagation and steering capability.

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